PROBLEMS OF BUILDING DEFECTS AFTER HANDING OVER THE KEY

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ABSTRACT

Building defects can be considered as a normal issue arises in the construction industry in Malaysia. Small defects could lead to serious defects. These building defects can lead to accidents, injury, and time to complete a project longer and costs will be higher. The main purpose of this study was to identify the types of common defects in buildings and main causes for each of the types of defects in the building, to understand the concepts of Defects Liability Period, and to study and identify the rational method for rectifying the building defects. In relation to the objectives, the scope of this study will focus on housing that has been occupied for less than ten (10) years where the buildings are reinforced concrete. Questionnaire session conducted with contractors and owners which are housing residents and were focused around Pahang and Kelantan. Data were analyzed using Average Index Percentage through Microsoft Excel. The study found that seven (7) defect that usually occurs in the building which are wall cracking, plumbing defects, cracked tiles, erosion of mortar joint, roof defects, dampness and unstable foundations. Building defects are caused by shrinkage, water pressure, poor quality materials, movement building, fungal decay, rain water and landslides. The main concept of Defect Liability Period is purposed to rectify the defects in certain period which have been agreed by the contractor and owner. Contractor has their own responsibility and the owner has their own right when the defect occurs. Rational methods were identified to rectify the defects, such as through compressible filler, install the equipment properly, replace with new tile, using suitable mortar, remove and replace the damaged roof with new one, using water repellent treatment and underpinning. Types of defects in the building and the causes should be identified first so that the defects can be rectified with proper and effective methods. The responsible party should give more attention to this problem as serious defects can be avoided.

ABSTRAK

Kecacatan bangunan merupakan perkara yang biasa diperkatakan dalam industri pembinaan di Malaysia. Kecacatan bangunan yang kecil boleh membawa kepada kecacatan yang lebih serius yang boleh mengakibatkan kemalangan, penambahan jangka masa projek serta peningkatan kos. Tujuan utama kajian ini adalah untuk mengenalpasti jenis kecacatan yang kerap berlaku dalam bangunan dan punca utama untuk setiap kecacatan tersebut, untuk memahami konsep *Defect Liability Period* serta mengkaji kaedah untuk membaiki kecacatan bangunan. Skop kajian ini tertumpu pada perumahan bangunan konkrit yang telah diduduki kurang daripada sepuluh (10) tahun. Sesi soal selidik dijalankan dengan pihak kontraktor dan penduduk perumahan dan tertumpu di sekitar Pahang dan Kelantan. Data kajian dianalisis menggunakan kaedah *Percentage and Average Index* melalui *Microsoft Excel*. Hasil kajian mendapati tujuh (7) kecacatan yang biasanya berlaku dalam bangunan iaitu keretakan dinding, masalah perpaipan, jubin retak, hakisan sendi mortar, kecacatan bumbung, kelembapan dan juga ketidakstabilan asas. Penyebab utamanya adalah pengecutan, tekanan air, bahan kurang berkualiti, pergerakan bangunan, pereputan kulat, air hujan serta tanah runtuh. Konsep utama *Defect Liability Period* untuk membaiki kecacatan dalam tempoh tertentu yang telah dipersetujui oleh kontraktor dan pemilik. Kontraktor mempunyai tanggungjawab mereka sendiri dan pemilik mempunyai hak mereka. Beberapa langkah dikenalpasti untuk membaiki kecacatan tersebut seperti melalui mampatan, memasang peralatan dengan betul, menggantikan jubin baru, menggunakan mortar yang sesuai, menanggalkan atap yang rosak dan menggantikan yang baru, menggunakan kaedah *water repellent* serta *stripping*. Jenis dan punca kecacatan perlu dikenalpasti terlebih dahulu supaya kecacatan boleh dibaiki melalui kaedah yang betul dan berkesan. Pihak yang bertanggungjawab perlu memberi lebih perhatian terhadap masalah sebegini supaya kecacatan yang lebih serius dapat dielakkan.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

An imperfection or flaws are the meaning of defect. Building defects can be a vexing problem for new home owners. A new home that full with defects is a bad package for new home owners which could be say that they buying a house that was already occupied. These defects will arise many implications as it shows negligence and lack of concern towards the important part in construction.

Housing building is a complex process, generally involves a broad field of materials and number of subcontractors to complete such as roofers, plumbers, electricians and the others. In housing, mistakes can and do occur in defect results. Minor defects can lead to serious defects that bring to some very critical complications. Cost of repair project will be higher if the defects detected after the building finished and also the longer building defects are left in place the more dangerous the building becomes too if the defects in serious case. It is never a good idea to hire a contractor of dubious skill just only to save the budget.

Usually the condition of construction is constantly changing. Companies must develop and improve continuously to become succeed. Changes must be based on knowledge of both the environment and one's own work. In this situation knowledge of defects nature that has occurred is necessary and very important. Effective actions can be taken to improve the process with this knowledge (P.-E.Josephson & Y.Hammarlund, 1998).

1.2 Problem Statement

As Malaysian Institute of Engineers President, Datuk Keizrul Abdullah said in New Straits Times 6th April 2010 that "It's only when a building collapses that everybody wakes up. Then we forget about it until the next problem arises. In some cases, it is necessary to have rules, regulations and laws"(Appendix A). Mostly small defects occurred will be assumed as nothing happen in the building. But there will be a huge confusion when serious damages detected.

Small defect classified as zero problem. But when big defect occured, there will be disputation as the defects will give bad effect and affect the human safety. This approved by this statement, "Serious infrastructure defects such as cracking walls and beams may lead to possible building collapse and jeopardise the safety of our children." This statement was issued by Cheah Chee Ho in New Straits Times 5th Nov 2004 (Appendix D).

In New Straits Times 1st May 2007, Datuk Seri Abdullah Ahmad Badawi said that "Maintainence is very important. I have said this many times but these people, as long as nothing happens, they don't care" (Appendix B). This means that the

building need to be checked details to detect any defects even the small one so that if any defects occured it can be avoided early and also easy to solve.

As stated in New Straits Times 2nd Nov 2007 by European Construction community, "Had defects occurred during construction, the contractor may have to spend a whopping 16 per cent (16%) in construction costs to rectify the defects, which can easily wipe out all his profits. Poor quality and defects lend the impression that the construction sector does not seem to care about its customers" (Appendix C). This shows that defects only give more problem once it occured such need to spend money to rectify these poor quality and give bad impression to the customers and the future customers.

Elizabeth John wrote in the New Straits Times 17 Jun 2007 that "One building defect after another and we are suddenly asking where all the good workmen have gone" (Appendix E). Nowadays, there are many defects issues appeared and make people wondering why is it happen and start asking about the quality and dispute the skilled workers.

These can be concluded that the defect problem will not considered as a serious issue as long as the building not collapse terribly and not affect the human safety. Nowadays, people consider the building quality is the second thing which categorised as unimportant issue. For them, the most important are time and cost as both give more profit and advantages to them. This quality should be taking serious as they have potential and can contribute to building defects if it considered as adjuncts.

1.3 Objectives

From the problem statement above, this study is prepared with three (3) objectives as follow:

i. To study the types and factors of building defects.
ii. To understand the concept of Defect Liability Period.
iii. To analyze the rational defect repair methods.

1.4 Scope of Study

In relation with the objectives of the study, the scopes of this research will cover few areas which are will be limited and focused at Pahang and Kelantan and also will be conducted after the buildings have been occupied less than ten (10) years which the buildings with reinforced concrete features will be focused. The questionnaire will be prepared and interview will be conducted with persons involved in contractor and building owner.

1.5 Methodology

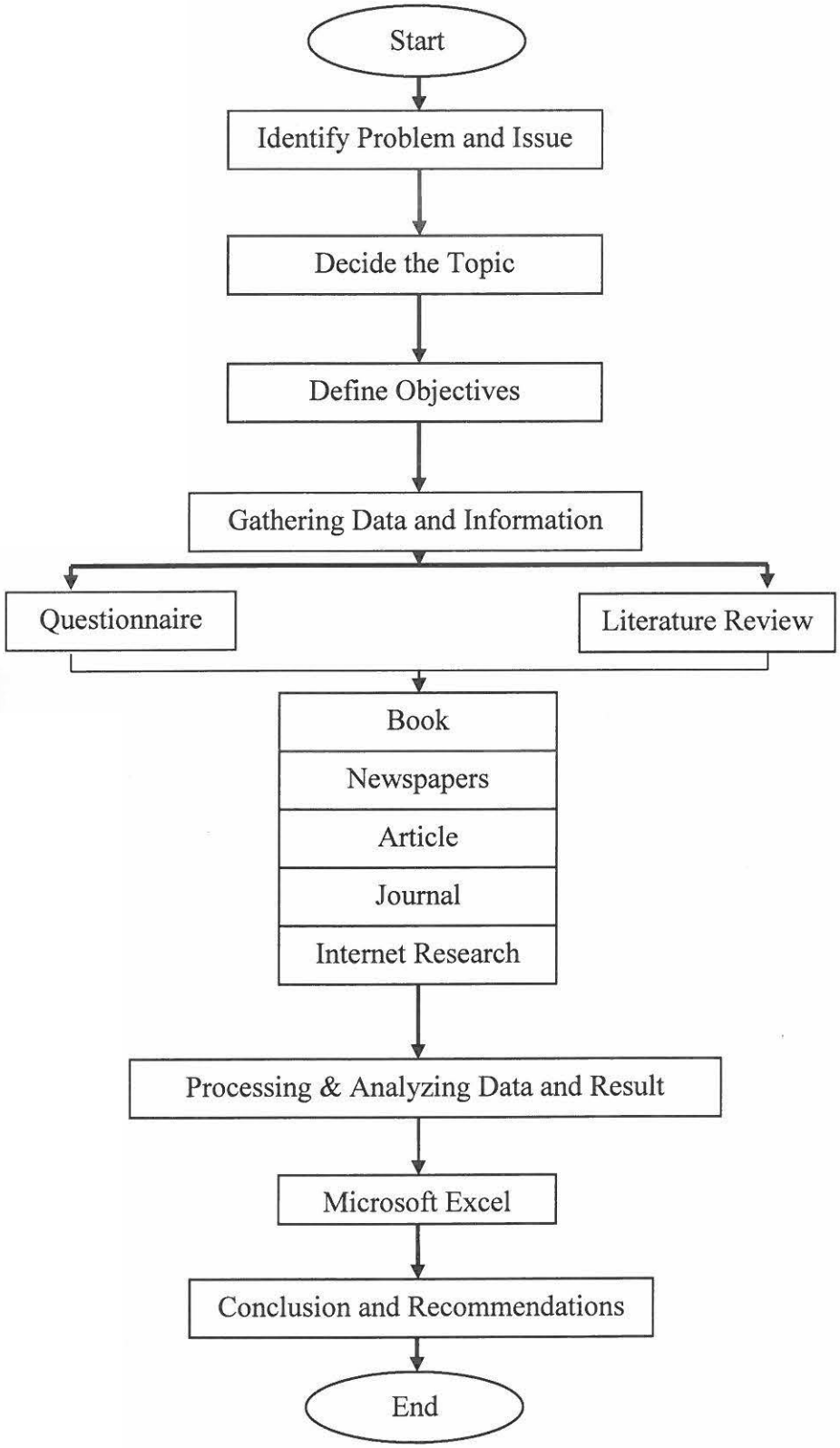

Figure 1.1: Flowchart of Methodology

1.6 Significance of Study

It is necessary to have knowledge about defects, its causes and risks before perform rational defect prevention. The purpose of the study is to stimulate improvements by indicating where preventive measures are most effective as well as how to perform them.

This study will give contribution to the parties involved in the construction industry. This study also can be used as a reference for further studies and further improvement for related research in the future. By identifying the type of housing with high demand, this would make a good investment.

Early steps to prevent defects can be taken when identifying the damage that is common. This can be as the guidance to provide good quality in construction. Result of the damage list developed by the buyer to the developer hopes to reduce the defects on the minimum level for future projects.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The nature of the building and construction process often leads to minor defects. Building defects will become an issue only if they are major or excessive. There is, however, an increasing concern over building defects which arise after new residential property developments are taken over by home buyers. For instance, Razzi (1995) reports the case of a home buyer in Salt lake City, Utah, USA, who encountered numerous building defects and prolonged delays in rectifying the defects. The Straits Times report quoted above is one of several articles which focus on the prevalence of building defects in Singapore.

Building defects will lead many implications that represent the negligence and also show lack of concern. In terms of building construction, there are few parties involved in making decision which are designer or consultant, contractor and owner. One of them or all of them may be the cause of building defects. Directing of project management uncertain which lack of information, changing of result that

not consistent, inefficient site survey also can cause the defects occur on building (Dr. Ahmad b. Ramly, 2001).

2.2 Definition

A building defect is that makes a project unsafe, dangerous or causes real damage to the consumer. Building defects affect society at large due to possible danger posed which result direct and indirect cost in repairs the damage, abnormally high maintenance, disputes and possible loss of building use.

Usually building defects include any deficiency in the performing or furnishing of the planning, design, inspection, supervision, construction or observation of construction new building, where there is a failure to construct the building in a reasonably workmanlike manner and or the structure fails to perform in the manner that is reasonably intended by the buyer.

Defective building construction not only contributes to the final cost of the product but also to the cost of maintenance, which can be substantial. Defective construction may lead to the complete failure of the structure. However, no structure is perfect hundred percent. Even the best built and the best maintained structures will always have few items in less than perfect condition.

2.3 Types of Defect

In general terms defects are where the standard and quality of workmanship and materials is deficient. Defects can be classified into two (2) main categories which are latent defects and patent defects (Anon, 2007).

Latent defects are defects which are not discoverable by normal examination or testing that manifests it after a period of time but the patent defects is otherwise that are defects which can be discovered by normal examination or testing (Anon, 2007).

Professor Vincent Powell-Smith describes a 'patent' defects as (Harbans Singh, 2003):

"A defect which is discoverable by reasonable inspection. In the context of engineering contracts, the term embraces all the items which the engineer or engineer's representative must be expected to find and bring to the contractor's attention so the remedial works can be carried out. Patent defects are plain to see, or at least, that is the theory. Whether the engineer could or should have seen defects on site during site visits has exercised more than one judicial mind..."

However, in 'Construction Law in Singapore and Malaysia', the authors ascribe a rather simple definition to the term 'patern' defects (Nigel M Robinson, 1996):

"... a defect that can be discovered by normal examination or testing..."

Both references ascribe the 'latent' defects as the following definitions (Harbans Singh, 2003):

"A defect which is not discoverable during the course of ordinary and reasonable examination but which manifests itself after a period of time. In building and civil engineering work the most common application is defects becoming apparent after the maintenance period expired."

Other than that, Robinson and Lavers explain a 'latent' defects in the following words (Nigel M Robinson, 1996):

"... a defect that cannot be discovered by normal examination and testing..."

In other words, patent defects are defects that can be either seen or can be discovered by means of reasonable inspection, examination or testing. The establishment of such defects is not merely confined to the defects that can be plainly seen or observed but encompasses also those that become apparent on reasonable inspection, examination and if necessary upon testing. The latter requirement to testing imposes a more onerous responsibility in terms of discoverability (Harbans Singh, 2003).

In contrast, latent defects are the ones that are either inherent or those that do not manifest themselves upon reasonable examination, inspection or testing. These comprise defects which will become apparent or noticable or capable of being discovered only when they become patent (Harbans Singh, 2003).

In the definitions for both categories of defects, the emphasis is on the words 'normal' or 'reasonable' whether these can be in relation to any inspection or examination or testing in establishing the type of defect in question. The

requirement therefore does not call for a meticulous or exhaustive process in establishing the said defects. The difference between these two (2) types of defects also extends to their consequential effects especially in terms of duration of liability, with latent defects involving a longer duration both contractual and under various statutory provisions (Harbans Singh, 2003).

2.4 Common Defects Found in Building

2.4.1 Dampness

Structural dampness refers to the presence of unwanted moisture in the building structure, either the result of intrusion from outside or condensation from within the structure. Oxley (1983) defines dampness as an atmosphere wetter than eighty-five percent (85%) relative humidity; and a material is damp if it is in equilibrium with this humidity. All dampness is water out of place, however it is convenient to classify its different manifestations by their source and the routes by which unwanted water enters the inhabited areas.

Dampness tends to give secondary damage to a building. The unwanted moisture enables the various fungi growth in wood, causing rot. Then, plaster and paint deteriorate and wallpaper loosens. Figure 2.1 below show the defect of dampness in the building:

Figure 2.1: Dampness defect

(Source: Problem Survey, 2008, P-CON Building Surveyors Sdn. Bhd.)

2.4.2 Wall Cracking

External walls may be harmful to a building if they are structurally unsound as it apart from distributing loads from roofs and floors to foundations. Vertical or diagonal cracks in the wall are common symptoms of structural instability. Such defects should be investigated promptly and the causes diagnosed (Prof. Dr. A. Ghafar Ahmad, 2004). Figure 2.2 below give a view of line crack on the wall:

Figure 2.2: Wall cracking defect

(Source: PreConstruction Condition Survey, 2008,

P-CON Building Surveyors Sdn. Bhd.)

2.4.3 Erosion of Mortar Joints

The main function is to even out irregularities of individual blocks, whether they are bricks or stones. It provides some adhesion between the blocks at the same time. Wall of mortared are less subject to erosion because of their footing, but their mortar joints and the surface of the stones themselves can crack and take in water, then freeze and split. The damaged wall that does not receive timely attention poses a safety hazard. Decayed mortar can be removed forcibly by the use of a mechanical disc or carefully raked out by using a knife or spike manually. Figure 2.3 below shows some view of erosion of mortar joints:

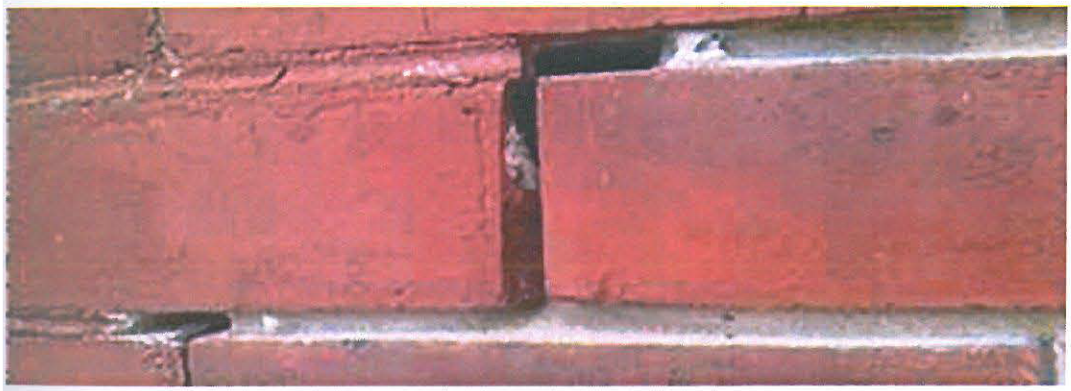

Figure 2.3: Erosion of mortar joints defect
(Source: Fretting Mortar and How to Fix It, Residential Settlement)

2.4.4 Roof Defects

Roof is very important to treat aging roof tiles as it often acts as a weather shield besides being one of the main structures in a building. In Malaysia, clay roof tiles have been widely used in the heritage buildings. They appear in different sizes and colors usually reddish, depending on the manufacturer that produced them. (Prof. Dr. A. Ghafar Ahmad, 2004). Figure 2.4 shows some broken roof and the Figure 2.5 shows poorly joint roof truss in every unit: